

ZURICH ROAD BRIDGE
Carrying Zurich Road over the
Southern Pacific, Chicago, and
St. Louis Railroad
Joliet Vicinity
Will County
Illinois

HAER No. IL-130

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PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Omaha, Nebraska 68102

HISTORIC AMERICAN ENGINEERING RECORD
ZURICH ROAD BRIDGE

I. INTRODUCTION

Present Location: Zurich Road
Spanning the Southern Pacific Railroad
(lately the Illinois Central Gulf, tradi-
tionally the Chicago and Alton Railroad).
South edge of Joliet; 1.5 miles south and 0.3
miles west of I-80 and IL 53 intersection.

USGS Quadrangle: Elwood 7-1/2, Illinois
Latitude 41°-29.46'; Longitude 88°-05.25'
UTM 16.409248.459362

Inventory Data: Zurich Road Bridge
Illinois Structure No. 099-3141
Section 93-10115-00-BR
NE 1/4 of Sec 28, T30N, R10E
Will County

Date of Construction: Unknown. Truss and bearing walls supporting
the frame bents appear to date from near 1890.
Approaches may date from the 1920s. All sup-
porting timber bents and abutments apparently
rebuilt around the 1940s.

Owner, Custodian: Southern Pacific Railroad

Present Use: Vehicular bridge, closed and programmed for
immediate replacement.

Significance: This queen post timber truss with timber ap-
proach spans on timber frame bents, spans the
Chicago-St. Louis main line of the Southern
Pacific Railroad. The earliest bridge was ap-
parently built at this location by the Chicago
and Alton Railroad before 1890, the truss and
trestle footings may be original but other
portions replaced. It is one of two known
queen post structures listed on the state
inventory, and one of two known railroad-built
timber structures carrying roadways over rail-
roads.

Historian: John B. Nolan, S.E.
10 October 1996

11. HISTORY

In 1854, the Chicago and Mississippi Railroad, later the Chicago and Alton and now the Southern Pacific Railroad, was extended northward from Bloomington to meet the Rock Island Railroad at Joliet. The alignment, approaching across prairie terrain from the south, follows a northerly natural drainage watercourse, into the DesPlaines River Valley. The DesPlaines and Illinois Rivers, flowing in the valley formed by glacial melt water, connect with the Illinois and Michigan and subsequent canals to provide a navigable waterway between the Great Lakes and the Mississippi River. Joliet, at the convergence of these shipping routes, is a natural gateway between Chicago and downstate.¹

The railroad descends some 120' into the river valley through a second growth wooded cut, passing beneath the Zurich Road bridge. Zurich Road, located on the prairie edge above the break line of a moderate slope into the valley, provides a one-mile east-west connector between the community of Preston, south of Joliet on Illinois Highway 53 (Formerly Chicago Street, later Historic Route 66), and County Route 42, which crosses the Illinois Waterway canal at the Brandon Road locks, southwest of Joliet. Highways Illinois 53 and County Road 42 provide the only passage over the waterway in the area. Zurich Road parallels a major Commonwealth Edison power line right-of-way and continues westward to provide direct access to power facilities on the DesPlaines River.²

The earliest ownership maps of Will County, dated 1862, 1873 and 1893, show Zurich Road following the northern east-west quarter line of Section 28, without deviation. The earliest topographic map of the United States Geological Survey, surveyed in 1890, adds a bend to Zurich Road, a southerly jog necessary to keep the roadway at the prairie level. The 1916 survey shows an updated jog as it exists today.³

Prior to the 1890s, an unimproved wagon path may have followed natural drain spurs to cross the railroad grade near the quarter line, a few hundred feet north of the present alignment. From the evidence appearing on USGS and ownership plat maps it appears that the earliest Zurich Road overpass was built at the present location before 1890.⁴

Nearby residents have no reliable knowledge of the bridge and no records exist in railroad documents. Any plans were lost in transfers between the successive owners before reaching the present archives of the Southern Pacific in San Francisco. Southern Pacific records show a sketch with clearances and a brief description of floor members.⁵

An assessment of timber conditions indicates the truss may date from near 1890 and the approaches rebuilt in the 1920s. The substructure may have been replaced about the 1940s. Replaced bents are not positioned closely on earlier stone walls. The bridge was maintained until July, 1993, when it was closed by Joliet Township, reportedly after an impact. No damage or shifting has been noted. Mounds of earth on the roadway block access. Several years ago, after assuming ownership, the Southern Pacific Railroad lowered the railroad grade a few feet to provide for passage of double stacked containers. Trestle bracing has been added.⁶

III. THE BRIDGE

A. The Bridge Type

The main span of the Zurich Road bridge is a timber Queen Post truss with east and west approach spans, all supported on timber frame bents.

King Post and Queen Post trusses were developed by early woodworking mechanics to provide additional floor support in spans of 25 to 30 feet and too long for available beams or parallel timbers. Because of inherent shear weakness in timber connections, the load carrying capacity in the connections of wooden structures of this type was very low until iron straps or rods were added by the mid-nineteenth century to provide resistance to tensile and shearing forces. In this bridge, vertical rods, suspended through the upper chord, support the two interior floor beams in the truss. An early text on bridge building describes this construction more correctly as a "Queen rod truss".⁷

The second timber queen post bridge known to exist in the state, the Daggert Road bridge in Carroll County, built in 1916, is, in contrast, a true queen post construction, utilizing dimensioned timbers, 12" square, and having all joints sandwiched and bolted between large steel connection plates.⁸

Typical of railroad construction, the Zurich Road bridge superstructure is assembled with timbers of generous proportions, giving a characteristic appearance of heavy, rough, functional and conservative design.

Sills of the present framed bents are supported on low masonry walls. Present timbers in the framed bents are creosoted, generally sound, and apparently replacements of original members. The present sills are not closely aligned to the older masonry support walls. Creosoted timber has been used since the latter half of the nineteenth century and has served well over fifty years in numerous locations. By their nature, timber railroad structures are relatively easy to repair and replace piecemeal.⁹

B. The Builder

The builder would have been a railroad bridge construction crew. The assembly of the timber approach spans and truss is typical of basic, early century methods once seen in roadway crossings built by railroads and now removed.

C. Structure Description

The Zurich Road Bridge is built at near right angles to the railroad alignment passing beneath. Clearance, 20' +/- above railway.

Measurements were made by the author and compared with Data Bank Inventory. For a sketch showing details of this six-span bridge, prepared by Boyer Engineering, Ltd., see page 11.¹⁰

Superstructure, timber:

Five multi-stringer approach spans, one queen-post truss.
Length: 134'-0" back to back of abutments.
Roadway width: 16'-0" clear between curb blocks and rails.

West approach, 3 spans, multi-stringer on trestles:

Approach roadway rises 7'-2" +/- to truss L0.
Span 1; West end span: deck length 15'-9";
Span 2; deck length 15'-9".
Span 3; deck length 22'-0".

Fifteen timber stringers, 6"x16", each span.
Deck and Rail components, see page 5.

Span 4, main span, Queen Post timber truss, 30'-0" long between bearings, details symmetrical about centerline, U1.5L1.5.

Trusses are 17'-2" center-to-center

Panel lengths: ends, 9'-0"; center, 12'-0"; total 30'-0".

Top chord, U1U2: 12"x10"x16'-0" long, bottom mortise 1/2" for U1L1 and U2L2 posts (at 12'-0" centers) and Panel 2 diagonal cross bracing.

Sloped end timbers, L0U1: 9"x9-1/2"; mitered to bear at L0 and U1, L0 end in lower chord L0L3.

Vertical posts, U1L1, U2L2: 9-1/4"x9"x4'-1", 1" inset into top chord mortise at U1.

Lower Chord, L0L3: 15"x9-1/2"x31'-6" long, top mortise at L0 for L0U1 and at L3 for L3U2. Kicker blocks 9-1/2"x15"x2", are bolted to tops of bottom chords, on end edges of vertical posts U1L1, U2L2.

Diagonal bracing, center span, L1U2 and U1L2: 7-1/2"x3-1/2", ends mortise in edges of upper and lower chords; bolt and block at center crossing.

Rod, U1L1, U2L2: 1-1/2" dia., through top chord; end sides of posts (L0, L3), through floor beam; steel plates, top 12"x10"x7/8", bottom 6"x6", double square nuts each end.

Interior floor beams at panels, L1L1, L2L2 etc.: 12"x10", held by rods to support stringers.

End floor beams, L0L0, L3L3: 10"x12" are bent frame cap timbers. Fifteen timber stringers 16"x6", simple spans, lapped over interior floor beams.

East approach, multi-stringer on trestle spans:

East approach roadway descends 3'-6" +/- to abutment.

Span 5; deck length 25'-9"

Span 6; east end span, deck length 24'-9"

Roadway width, 16'-0"; 15 timber stringers, all spans, 6"x16" timbers at 12" centers, lapped over bent frame caps; deck planking, 4"x10"; asphalt wearing surface, 3".

Hitching post rails, 2"x6" full dimensioned planks, 1 at 1'-11" above the roadway; top rail, at 3'-4", consists of face and cap planks. Rails of the bridge and approaches are dilapidated and of doubtful effectiveness. Portions are missing or patched with added timbers scabs.

Substructure:

Ashlar limestone masonry walls, 2'-0" wide and of varying lengths to accommodate sill beams, support all pier and abutment bent frames. Footing depths are unknown. Four feet of the Pier 3 wall is above ground and supported with two rubble masonry buttresses. Top of wall is leveled lengthwise by an added concrete wedge varying from 0" to 5".

All framed bents consist of five vertical posts, 10"x10" nominal at 3'-0" centers. Battered end posts at track level bents 4 and 5, slope from 3'-0" at top to 7'-0" at sill beam; other piers and abutments have battered end posts at similar slopes. Cap and sill beams, 12"x10" nominal. Cross sway bracing on all piers, 3"x10" nominal, extends and is bolted to sills and caps; single diagonal bracing on abutment faces.

Vertical posts of bents at Piers 4, 5 and east abutment are connected with three continuous longitudinal, approximately horizontal, struts; diagonal thrust bracing connects tops of Pier 4 outer posts to bear at base of Pier 5 wall, and tops of Pier 5 outer posts to bear at base of abutment wall. Timbers are 6"x12" nominal.

No similar longitudinal bracing has been installed between the western bents.

The east abutment assembly consists of a masonry wall, sill beam, vertical and battered posts, and cap beam, height of timber components totals 6'-7". Timber bulkheads, 6"x10" planks, behind abutment bent are attached to walls parallel to the roadway, and presumed cross-tied with cables, support earthen approach roadway fill. East approach length, with railing, about 72'.

The west abutment assembly is inaccessible but is believed to be similar to the east abutment. The northwest approach rail and presumably the timber retaining wall supporting it are about 105' in length. The southwest railing and timber retaining wall are about 22' longer.

D. Present Condition And Modification

Pier frame timbers are generally sound and creosoted. A few timbers, particularly the lower ends of pier cross sway bracing exposed to the weather, with section loss due to rot, have been reinforced with bolted scab timbers over deteriorated areas. East bents #4 and #5 have been stabilized longitudinally with horizontal and sloping timbers.

The deck is transversely cracked over bents and floor beams but is usable.

The bridge is closed with earthen mounds. No load posting signs remain.

E. Ownership and Future

Plans have been prepared for a new structure to span the tracks about 200' north of the present bridge. Although this timber bridge is of more than usual historical and structural interest, as one of the last of its type, its location over the railroad and deteriorated physical condition preclude its preservation. The existing bridge will be removed by crews of the Southern Pacific Railroad.¹¹

IV. END NOTES

¹Fayette Baldwin Shaw, PhD., Early Means of Transportation (Will County Historical Society, Summer, 1992) pp. 18ff.

²United States Geological Survey, USGS, Elwood 7.5 Minute Series Topographic Map (Washington, D.C.: USGS, 1993 edition).

³Map of Will County, Illinois (S.J. Burhans and Jan Vechten, 1862); Combination Atlas Map of Will County, Illinois (Elgin: Thompson Bros. and Burr, 1873); Plat Book of Will County, Illinois (Chicago: George A. Ogle and Company, 1893); USGS, Wilmington 15 Minute Series Topographic Map, 1890 Survey (Washington D.C., USGS, 1911 Reprint); USGS, ibid, 1916 survey, 1918 printing; Standard Atlas of Will County, Illinois (Chicago: George A. Ogle and Company, 1909-10); Atlas and Plat Book, Will County Illinois (Rockford: Rockford Map Publishers, 1974).

⁴USGS Quadrangles, Wilmington 15 editions, note ³ above.

⁵Sequence of owners: Chicago and Mississippi Railroad; St. Louis and Alton Railroad; Chicago and Alton Railroad; Gulf, Mobile and Ohio Railroad; Illinois Central Gulf Railroad; Chicago, Missouri and Western; Southern Pacific Railroad. Conversation: Laverne Lamkin, Engineer of Clearances, Southern Pacific Railroad, San Francisco, September 29, 1995.

⁶Conversation: Nick Tomac, Joliet Township Highway Commissioner, August 26, 1996.

⁷"Wooden Bridges," International Correspondence Schools, (I.C.S.), Reference Library (Scranton, Pennsylvania: International Textbook Co., 1908) Sec. 80, pp. 14ff.

⁸Illinois Department of Transportation (IDOT), Historic Bridge Survey List. (Springfield: Bureau of Location and Environment, 1992) p. 7101a.

⁹"Accomplishments in Timber Technology," Transactions (New York: The American Society of Civil Engineers, 1953) pp. 744 ff; "Use of Wood on American Railroads," (Ibid) pp. 797.

¹⁰Boyer Engineering Ltd., bridge details sketch; measurements by author, June 9, 1996, verified by IDOT Data Bank. (Springfield: Urban Planning Program, Data Management Unit.) James R. Rappe, contact.

¹¹Conversations: Bruce Gold, Asst. County Engineer; Nick Tomac, August 26, 1996.

V. BIBLIOGRAPHY

A. Books

International Correspondence Schools Reference Library, "Wooden Bridges", Sec. 80. (Scranton, Pennsylvania: International Textbook Co., 1908). (Early textbook giving state of art bridge construction).

Shaw, Fayette Baldwin, PhD., "Early Means of Transportation", Quarterly. (Joliet: Will County Historical Society, Summer 1992). (History of early railroads in Will County).

Transactions, American Society of Civil Engineers, "Accomplishments in Timber Technology" and "Use of Wood on American Railroads." (New York: ASCE, 1953). (Collection of reports in Centennial Edition of Society).

B. Maps

Map of the State of Illinois.

Chicago: R.K. Swift, 1854. (Map shows "all its railroads, completed or in progress").

Map of Will County, Illinois.

S.J. Burhans and Jan Vechten, 1862.

Combination Atlas Map of Will County, Illinois.

Elgin: Thompson Bros. and Burr, 1873.

Plat Book of Will County, Illinois.

Chicago: George A. Ogle and Co., 1893.

Standard Atlas of Livingston County, Illinois.

Chicago: George A. Ogle and Co., 1909-1910.

Atlas and Plat Book, Will County, Illinois.

Rockford: Rockford Map Publishers, 1974.

Wilmington Quadrangle, 15 Minute Series.

Washington D.C.: U.S. Geological Survey, Survey 1890, Reprint 1911.

_____. Survey 1916, Printing 1918.

_____. Survey 1954, Printing 1959.

Elwood Quadrangle, 7.5 Minute Series.

Washington D.C.: U.S. Geological Survey, 1993 Edition.

C. Reports

Illinois Department of Transportation (IDOT), Historic Bridge Survey List. Springfield: Bureau of Location and Environment, 1992.

D. Library Resources

Illinois State Historical Library
Old Capitol Square
Springfield, Illinois 62702
Telephone 217/524-6358
(Histories, newspaper microfilms)

Illinois State Library
Arlyn Sherwood, Map Librarian
300 South Second Street
Springfield, Illinois 62701
Telephone 217/785-5600
(Map collection)

Joliet Public Library
Information Services: Roger Gambrel
150 N. Ottawa Street
Joliet, IL 60432-1632
Telephone 815/740-2666
Local history archives

E. Conversations

Gold, Bruce, Assistant County Engineer
Will County Highway Department
Laraway & Cherry Hill Road
Joliet, Illinois 60433
Telephone 815/727-8476

Kaye, Ron, Bridge Engineer
Illinois Central Railroad
17641 South Ashland Avenue
Homewood, Illinois 60430

Lamkin, Lavern, Engineer of Clearances
Southern Pacific Railroad
One Market Plaza
San Francisco, California 94105
Telephone 415/541-1514

Tomac, Nick
Joliet Township Highway Commissioner
910 S. Joliet Street
Joliet, Illinois 60436
Telephone 815/722-6646

F. Sketch of Zurich Queen Post Truss

Boyer Engineering, Ltd.
900 East Christopher Lane, Suite 4
Springfield, Illinois 62707
Telephone 217/529-7995

Report prepared by:
John B. Nolan, S.E.
66 Circle Drive
Springfield, IL 62703-4805
Telephone 217/529-1550

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